On the frozen edge

Ruthrauff, Dan

Stellingen behorende bij het proefschrift

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Environmental and physiological constraints in the life history of a northerly-wintering shorebird

Daniel Robert Ruthrauff

1. Upper Cook Inlet, Alaska, is the world's coldest site that regularly hosts nonbreeding shorebirds; these birds are almost exclusively Rock Sandpipers *Calidris p. ptilocnemis* (Chapter 3)

2. *Ptilocnemis* Rock Sandpipers have one of the most restricted annual distributions of any shorebird species (Chapters 2, 3)

3. *Ptilocnemis* Rock Sandpipers carry unusually high fat stores for a nonbreeding shorebird; a dearth of aerial predators in upper Cook Inlet during winter makes this otherwise risky trade-off between energy stores and escape performance feasible (Chapter 4)

4. Compared to conspecifics, *ptilocnemis* Rock Sandpipers exhibit intrinsic adaptations related to resource acquisition but not apparently those related to energetic output (Chapters 5, 6)

5. In the context of energetic expenditure and physiological condition, wintering in upper Cook Inlet, Alaska, is akin to a months-long migration for *ptilocnemis* Rock Sandpipers (Chapter 7)

6. A warming climate may not necessarily bode well for cold-hardy sandpipers (Chapter 7)

7. Sometimes characteristics of the prey are more important than those of the predator: ultimately, *ptilocnemis* Rock Sandpipers are able to inhabit upper Cook Inlet, Alaska, during winter thanks to an abundance of high-quality *Macoma* (Chapter 7)

8. Seemingly simple ecological questions invariably yield complicated results: 'In many cases it is not reasonable to expect to be able to make inferences from a single (best) model: biology is not simple; why should we hope for a simple inference from a single model?' —Burnham and Anderson 2002.

9. Sometimes the greatest hurdle is the first. 'At this moment the VWA is still internally fighting over the requirements mentioned in the certificates. I think we will have a solution today. Please note that we also have no clue what agent will clear the birds.' —quote from KLM agent in Amsterdam to another in Los Angeles regarding the intercontinental transport of Rock Sandpipers.

10. Field efforts during winter in upper Cook Inlet, Alaska, are impractical: waist-deep mud, 10-m tides, remote field sites, 5-hour day lengths, incapacitating cold. A study approach that incorporates natural history perspectives with laboratory experiments can nonetheless yield powerful insights in lieu of field observation.

11. Even where dedicated field efforts are possible, an approach combining both perspectives is powerful and underutilized. Despite our vocation's 'almost medieval horror of experiment' (Heinroth, in Stresemann 1975) and the lament that 'the pure study of nature languishes' (Beehler 2010), each approach obviously strengthens the other.

12. Q: Why do *ptilocnemis* Rock Sandpipers winter in upper Cook Inlet, Alaska?
    A: Because they can.